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olution. The survival of the fittest, in the case of man, is as much a survival of fit ideas, institutions, etc., as of individuals. In man individual plasticity is required rather than inherited special traits. A realization of this would make a book such as Mr. Kidd's *Social Evolution* impossible. Mr. Kidd's major premise is that evolution takes place exclusively through severe natural selection, but, as a matter of fact, human progress also occurs through coöperative improvement in the social environment.

Professor Le Conte has contributed a very interesting address to the July number of *The Monist* in which he distinguishes social progress from organic development. He, however, regards the Lamarckian factors as essential to human progress, and does not, I think, adequately value the progress that can be made through improving the environment without regard to any organic change in the individual. Indeed I shall follow the advice of Mr. Le Conte in a recent number (Vol. I., page 188) of this journal and venture to point out what seems to me a fallacy in his argument. Mr. Le Conte writes: "Now I cannot at all accept this view [that Lamarckian factors are no factors in evolution]; I will not stop to argue it, but simply point out some logical consequences when applied to human progress; consequences which, it seems to me, are nothing less than a *reductio ad absurdum* for the view;" and he proceeds to describe the consequences, "the pitiless destruction of the weak, the sick and the helpless," against which "we instinctively revolt." But even if these practical consequences follow, one is surely not justified in arguing that facts do not exist because we would gladly have them otherwise.

J. McKEEN CATTELL.

SCIENTIFIC LITERATURE.

A Text-book of Zoögeography. By FRANK E. BEDDARD. Cambridge, 1895. (Cambridge Natural Science Manuals—biological series.)

Zoögeography treats of the geographical distribution of all animals, and in 'A Text-book of Zoögeography,' Mr. Beddard himself says: "The science is not limited to a consideration of the animals which inhabit dry land; but," he immediately adds, "this volume will only deal with *those forms*, touching incidentally upon

some of the fresh water species, whose distribution is apparently governed by the same laws as those which govern the distribution of the purely terrestrial animals" (p. 4). Inasmuch as the distribution of marine animals is determined by other factors than the distribution of terrestrial and fresh-water forms, we have some reason to complain of the too comprehensive scope of the title, but, with this caveat, we can judge the work in question on its own merits as an epitome of the geographical distribution of mammals and birds with some references to other animals.

The time-honored Sclaterian 'regions' are retained, although modified by their own author long ago (1876). The subject-matter has been repeatedly discussed and need not detain us here. The reasons (often traversed) which have influenced Mr. Beddard are given by him at length (pp. 85-87). It is not untimely, however, to repeat that there is an entire want of congruity between the inland and marine faunal realms, and it may be added that while there is every gradation between marine and fresh-water types, the great bulk of fresh-water fishes, at least, has long been segregated completely from salt-water types, the Ostariophysi, including the hosts of Characinids, Cyprinids, Gymnotids, Silurids and their numerous allies, having only a few descendants that have reverted to the salt waters. This great assemblage, by the way, furnishes an excellent illustration of the truth of Mr. Beddard's assertion that "the facts of distribution are constantly liable to be misunderstood through ignorance of classification," and that "a knowledge of comparative anatomy is absolutely essential to the student of distribution" (25). The several families of Ostariophysi are widely separated in European works on ichthyology and associated with forms with which they have no affinity. Such knowledge, too, would have prevented the coupling of the *Galaxiidae* and *Haplochrominidae* as 'two families of Salmonoid fishes' (171), for they really have no relationship to the Salmonoids, but represent a group confined to the fresh waters of the southern hemisphere. Another misapprehension as to relationships on account of superficial similarity disguising anatomical differences is responsible for the statement that "the chief feature of the island [Madagascar] is the pres-

ence of the American genera *Philodryas* and *Heterodon* among snakes, a fact which is remarkably paralleled by the *Centetidæ* among the *Insectivora*" (189). The Madagascar snakes are differentiated generically and belong to different groups from the American species, and the *Centetidæ* belong even to a family differing from the American forms (*Solenodontidæ*) with which they have been associated.

Mr. Beddard's work is very suggestive and leads to so many questions of interest that it is with difficulty we can circumscribe our inquiries within the limits of a review. We can only touch upon a few points of interest.

Although the only class groups systematically considered by Mr. Beddard are the mammals and birds, he has introduced a number of sections treating of the distribution of various minor groups, as the edentates, cuckoos, tortoises, lizards, crocodiles, snakes, batrachians, scorpions and earthworms. The section on the earthworms is especially valuable, as it contains the results of Mr. Beddard's most recent investigation of a group of which he has made a special study and quite lately published a monograph.

Mr. Beddard very properly remarks that "Land Mollusca would appear on many grounds to be exceedingly valuable as furnishing evidence in favour of ancient land connections" (p. 83), but then quotes Mr. Blanford in opposition. Recent molacologists, and above all Prof. Pilsbry, have done much to correlate the data of structure and distribution. We feel inclined here to take exception to the statement re-echoing the old idea of 'the existing genera *Pupa* and *Zonites* going back to carboniferous times' (p. 85). The carboniferous species referred to those genera are certainly much like the recent species, but it must be remembered that shells having the same contours are secreted by animals quite dissimilar in anatomical features. The presumption is entirely against the generic identity of the ancient and modern forms, and *Dendropupa* (Owen, 1862) is a name proposed for the old upiform shells. Nevertheless the groups of mollusks are very long lived, and their presence in a country has a significance quite different from that of a mammal or other vertebrate. This may be well understood when we recall that almost all of the modern families of mollusks

originated before the commencement of the tertiary period, while almost none of the families of mammals came into existence until long after. The correlated fact follows that few families or even genera of mollusks are circumscribed in their distribution like so many of the vertebrates.

Mr. Beddard, in his systematic sketches of the various regions of the globe, has added lists of 'families' and 'genera' supposed to be 'peculiar to' those regions, but sometimes without sufficient reason. For example, of 'genera confined to the [Palearctic] region' (p. 89), *Anurosorex* also occurs in the oriental region (Assam), *Bos*, however restricted, in the oriental region at least; *Capra* in 'the Neilgherries and some other ranges of southern India' (p. 22), and *Perisorex*, *Cyanocitta*, *Nucifraga* and *Acanthis* are common in North America. Indeed *Cyanocitta* is exclusively North American, and must have been introduced into the present list through some mistake. The lists of the families and genera peculiar to the 'Neoarctic region,' as well as to the 'Neotropical region,' require still more revision and large additions which space forbids us to undertake. In view of the fact that many peculiar South American genera have been omitted, we are rather surprised to find *Tomes'* almost forgotten *Hyracodon* (1863) resuscitated as a 'peculiar' genus of Neotropical marsupials (108). *Tomes'* genus may possibly have been based on a young *Didelphys*, although the characters assigned scarcely seem to be applicable to such; it has even been overlooked by Thomas, but in any even the name *Hyracodon* cannot be used, as it had been taken previously by Leidy for a well-known extinct genus related to the rhinoceroses.

Because animals are found between certain degrees of latitude, it does not follow that they specially affect the temperatures prevalent in the lowlands of such countries. The humming birds may be more numerous in tropical lands, but many types are confined to mountains and occur about the summits of very high ones and consequently in cold regions. Mr. Beddard says that "it upsets the current notions as to the tropical habits of the humming birds to learn that a species, *Selasphorus rufus*, breeds in Alaska" (p. 97), but the well-known facts as to the elevations where humming birds occur and as to the extension of species into the still

bleaker regions of the southern hemisphere should 'upset' any notion as to their intolerance of cold. Nor is it necessary to postulate a decreased temperature as the cause of isolation of the relics of a past dynasty. The proposition that the tapirs are 'purely tropical animals,' and that they have been isolated 'by the gradual decrease of heat in the northern hemisphere' (p. 131), is scarcely tenable in view of the fact that one of the species—*Tapirus pinchaque*—is an inhabitant of heights where the temperature is but moderate. The camelids, whose now living members are as isolated as the tapirs, are likewise capable of withstanding much cold as well as heat. Their demission from regions once inhabited by an ancestral stock must therefore have resulted from other complications than loss of heat, although that may have been one of the causes. Temperature in many cases affects animals indirectly (by means of its influence on the food supply) rather than directly.

Numerous names are used for animals for which those who follow strictly rules of priority would employ others, and probably Mr. Beddard himself would in some cases use others if he reconsidered the questions involved. Among such is *Platydictylus facetanus*, properly known as *Tarentola mauritanica*, which we refer to in order to add that it certainly cannot be called a 'cosmopolitan Gecko' (p. 10), inasmuch as it is almost or (according to Boulenger) quite limited to the 'Mediterranean District.' In one case at least different names have been used for the same genus, as *Semnopithecus* (106) and *Presbytes* (103). In other cases wrong names have been used instead of those intended, as *Crice-tomys* (90) for *Cricetus* and *Chæropotamus* (100) in place of *Chærodes* (preoccupied) or *Chærop-sis*, and these might perplex some readers, as there are genera legitimately bearing the names so misused. Another error is manifest in the statement that the Central American tapirs 'were separated by the late Mr. Alston as a distinct genus *Elasmognathus*' (p. 109), that differentiation having been effected by Gill and Alston did not approve of it.

Typographical errors occur to (or possibly slightly above) the normal extent we are accustomed to find in works in which so many names

of Greek or Latin origin are used. The following have been found in a hasty perusal, and are here noted for the benefit of readers: *Charadriæ* (8) for *Charadriidæ*, *Chærocampa* (10) for *Chærocampa*, *Jemlanica* (21) for *Jemlaica*, *Cinisternidæ* (38) for *Cinosternidæ*, *Testudinæ* (39) for *Testudinidæ*, *Pixys* (39) for *Pyxis*, *Pelomedusæ* (39) for *Pelomedusidæ*, *Chelydidæ* (39, 40) for *Chelyidæ*, *Carettochelydidæ* (39) for *Carettochelyidæ*, *Geckotidæ* (40) for *Geckonidæ*, *Xanthusiidæ* (42) for *Xantusiidæ*, *Loxocenius* (46) for *Loxocemus*, *Discophidæ* (49) for *Dyscophidæ*, *Casarea* (46) for *Casarea*, *Panthalops* (89, 92) for *Pantholops*, *Ipeyan* (89) for *Impeyan*, *Autrozous* (93) for *Antrozous*, *Ovibus* (93) for *Ovibos*, *Pilohela* (94) for *Philohela*, *Cærebidæ* (107) for *Cærebidæ*, *Rhymphastidæ* (107) for *Rhampastidæ*, *Mimocychla* (108) for *Mimocichla*, *Apterygiidæ* (113) for *Apterygidæ*, *Starnænas* (108) for *Starnænas*, *Calænas* (114) for *Calænas*, *Hoplochitonidæ* (171) for *Haplochitonidæ*, *Paretroplopus* (178) for *Paretroplous*, *agestis* (186) for *agrestis*, *Mani* (204) for *Mawi*, and *Dicæidæ* (204) for *Dicæidæ*.

Some others of new orthography perhaps have been given as corrections, as *Osteolæmus* (43, 44) for *Osteolæmus*, although a number that would much more bear correction are allowed to retain their original form, such as *Pediocætes* (97) for *Pediæcetes*, and *Lymnæa* (142) for *Limnæa*. *Osteolæmus* indeed is perfectly in accord with classical words, as, *g. e. ὀστεογενής* (Aristotle), and a word frequently used by Mr. Beddard himself—osteology.

We would not be deemed to have examined the work thus criticized with a censorious mind; recent inquiries into the margin of error in various publications have led us to apply the same method to Mr. Beddard's volume, and we have been incited by a spirit of curiosity rather than of fault-finding. 'Balm' for the errors he and his printers have fallen into may be found in like failings of others (see SCIENCE for July 26, 1895). Really Mr. Beddard's work is a meritorious production and contains much that would be looked for in vain in larger works; it will, indeed, be of more use to some than a more bulky production, and we wish for it all success. If a second edition is called for, the corrections here made may help the author to perfect it.

THEO. GILL.